D2AEC1904 (S1) **(3 Pages)** **Name.....**
Reg.No.....

SECOND SEMESTER MA DEGREE EXAMINATION, APRIL 2021

(Improvement/Supplementary)

ECONOMICS

FECO2C08: QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS II

Time: 3 Hours **Maximum Weightage: 30**

Part A: (Multiple Choice Questions). Answer *all* questions. Each carries $^1/_5$ weightage

1. Let R be a non-empty relation on a collection of sets defined by ARB if and only if A ∩ B = Ø
   (a) R is relexive and transitive (b) R is symmetric and not transitive
   (c) R is an equivalence relation (d) R is not relexive and not symmetric
2. When P (A∩B) = P (A) P (B), they are called :
   (a) Independent events (b) Equally Likely events
   (c) Dependent events (d) Mutually Exclusive events
3. The third moment about the mean is used to measure.
   (a) Mean (b) Variance (c) Kurtosis (d) Skewness
4. The mean of the Binomial random variable with parameters n and p is given by:
   (a) np (b) n(1-p) (c) p(1-p) (d) np(1-p)
5. $(S_n - np)/n$ Converges in probability to 0. This stability property is called:
   (a) Kronecker's Lemma (b) Bernoulli WLLN
   (c) Khintchine's WLLN (d) Law of Iterated Logarithm
6. Critical region is associated with…….
   (a) Point estimation (b) Internal estimation
   (c) Test of hypothesis (d) None of the above
7. _____ is an aggregate of objects, animate or inanimate under study.
   (a) Sample (b) Statistic (c) Population (d) Parameter
8. What is the mean of t-Distribution?
   (a) 0 (b) n (c) 1/n (d) n^2
9. Which one of the following are not a method of estimation?
   (a) Method of Least Square (b) Method of moments
   (c) MLE method (d) Sufficiency
10. Which one of the following is a Parametric Test?
    (a) χ^2 test (b) F- test (c) Median Test (d) U- test

(PTO)

11. Power of the test under H_1 is:

    (a) 1-α (b) α (c) β (d) 1- β

12. Which test is used to test independence of attributes?

    (a) Kruskal Wallis test (b) χ^2 test (c) F- test (d) Wald-Wolfowitz test

13. ANOVA is used to

    (a) Compare the variance of 2 sets of observations.

    (b) Compare the means of 2 sets of observations.

    (c) Compare the means of more than 2 sets of observations.

    (d) Compare the variances of more than 2 sets of observations.

14. Error term of ANOVA should follow

    (a) Normal with zero mean (b) Normal with variance σ^2.

    (c) Both (a) and (b) (d) None of the above.

15. What are the two types of variance you are trying to separate in ANOVA?

    (a) Independent and Dependent (b) Between and within group

    (c) Variance and Covariance (d) None of the above.

(15 × $^1/_5$= 3 weightage)

Part B: (Very Short Answer Questions). Answer any *five* questions. Each carries 1 weightage

16. Let A and B be two finite sets such that n(A) = 20, n(B) = 28 and n(A ∪ B) = 36, find n(A ∩ B).
17. Find the standard error of sample mean.
18. Define Log-normal distribution.
19. Describe Sampling Distribution and Sampling Error.
20. Define F-statistic and χ^2-statistic.
21. Define χ^2 test for Goodness of fit.
22. Define power and significance level.
23. Explain one way ANOVA.

(5 × 1 = 5 weightage)

Part C (Short Answer Questions). Answer any *seven* questions. Each carries 2 weightage

24. A bag contains 8 white and 4 red balls. Five balls are drawn at random. What is the probability that 2 of them are red and 3 white?
25. Distinguish between the Classical and Axiomatic definition of the probability.
26. Define Discrete Uniform Distribution. Obtain its mean and variance.

27. Define Gamma distribution obtain its characteristic function.

28. Derive the sampling distribution of the mean of a random sample from normal distribution.

29. State Lindeberg-Feller Theorem on Central Limit Theorem?

30. Obtain 100(1-α)% confidence interval for mean based on samples from normal distribution.

31. Define Least Square estimation.

32. Give details on Wilcoxon- Mann Whitney U Test.

33. Define

    (a) Simple and composite hypothesis. Give examples.

    (b) In a simple random sample of 600 men taken from a big city 400 are found to be smokers. In another simple random sample of 900 men taken from another city 450 are smokers. Do the data indicate that there is a significant difference in the habit of smoking in the two cities?

(7 × 2 = 14 weightage)

Part D: (Essay Questions). Answer any *two* questions. Each carries 4 weightage

34. (a) State and prove addition theorem of Probability.

    (b) A manufacturing firm produces steel pipes in three plants with daily production volumes of 500, 1000 and 2000 units respectively. According to past experience, it is known that the fraction of defective outputs produced by the three plants are respectively 0.005, 0.008 and 0.010. If a pipe is selected from a day's total production and found to be defective, what is the probability that this defective pipe is from plant two?

35. (a) State and prove Bayes Theorem.

    (b) Explain Weak Law of Large numbers.

36. (a) Define MLE. State its properties.

    (b) If X follows Normal with mean μ and variance σ^2, find out the MLE for μ and σ^2.

37. (a) Give a detailed note on parametric and non-parametric tests.

    (b) Explain the properties of good Estimators?

(2 × 4 = 8 Weightage)